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विद्युततकनीकी पारिभाषिक शब्दावली

भाग 68 सतही ध्वानिकी तरंग (सॉ) फिल्टर

Indian Standard

ELECTROTECHNICAL VOCABULARY

PART 68 SURFACE ACOUSTIC WAVE (SAW) FILTERS

UDC 621·372·54 : 001·4

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Piezoelectric Devices for Frequency Control and Selection Sectional Committee, LTD 12

FOREWORD

This Indian Standard (Part 68) was adopted by the Bureau of Indian Standards on 14 December 1989, after the draft finalized by the Basic Standards on Electronics and Telecommunication Sectional Committee in consultation with the Piezoelectric Devices for Frequency Control and Selection Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

The surface acoustic wave (SAW) filters are used in telecommunications, measuring equipment, radar systems and consumer products.

This standard (Part 68) covers the general terms and definitions relating to surface acoustic wave (SAW) filters.

This standard follows IEC Pub 862-1-1 (First Edition) - 1985, 'Surface acoustic wave (SAW) filters Part 1 : General information, test conditions and methods, Chapter 1 : standard values — Section One — General and Section Two — Terms and definitions; issued by International Electrotechnical Commission (IEC).

This standard is one of the series of Indian Standards on electrotechnical vocabulary.

Indian Standard

ELECTROTECHNICAL VOCABULARY

PART 68 SURFACE ACOUSTIC WAVE (SAW) FILTERS

1 SCOPE

1.1 This standard (Part 68) covers general terms and definitions relating to surface acoustic wave (SAW) filters.

2 TERMS AND DEFINITIONS

2.1 Surface Acoustic Wave (SAW)

An acoustic wave, propagating along a surface of an elastic substrate, whose amplitude decays exponentially with substrate depth.

2.2 Surface Acoustic Wave Filter (SAW Filter)

A filter characterized by a surface acoustic wave which is usually generated by an interdigital transducer and propagates along a substrate surface to a receiving transducer.

2.3 Power Flow Vector

A vector, analogous to a poynting vector, characterizing energy propagation caused by a surface acoustic wave.

2.4 Propagation Vector

A vector characterizing the phase progression of a wave.

2.5 Power Flow Angle

The angle between the direction of power flow vector and the direction of propagation vector.

2.6 SAW Beam Steering

SAW propagation phenomenon in anisotropic materials described by an angle of power flow, which is not zero.

2.7 SAW Diffraction

A phenomenon (analogous to diffraction of light from a source of finite aperture) which causes SAW beam spreading and wave front distortion.

2.8 SAW Coupling Coefficient (k_s)

SAW electromechanical coupling coefficiency is defined as follows:

$$k^2_s = 2\left|\frac{\Delta v}{v}\right|$$

where

$\frac{\Delta v}{v}$ is the relative velocity change produced by short-circuiting the surface potential from the open-circuit condition.

2.9 Interdigital Transducer (IDT)

A SAW transducer made of a comb-like conductive structure deposited on a piezoelectric substrate transforming electrical energy into acoustic energy or vice versa.

2.10 Unidirectional Interdigital Transducer (UDT)

A transducer capable of radiating and receiving surface acoustic waves in or from a single direction.

2.11 Multiphase Transducer

An interdigital transducer having more than two inputs which are driven in different phases. Usually used as unidirectional transducer.

2.12 Finger

An element of the IDT comb electrode.

2.13 Dummy Finger

A passive finger which may be included in order to suppress wave-front distortion.

2.14 Bus Bar

A common electrode which connects individual fingers together and also connects the filter to an external circuit.

2.15 Weighted-Response Transducer

A transducer intended to produce a specified impulse response by design of the structure. See, for example, **2.16** to **2.21**.

2.16 Finger Overlap or Source Strength

The length of a finger pair between which only electromechanical interaction is generated.

2.17 Apodisation

Weighting produced by the change of finger overlap over the length of the IDT.

2.18 Withdrawal Weighting

Weighting by removal of fingers or sources.

2.19 Capacitance Weighting

Weighting by change of capacitance between electrodes.

2.20 Series Weighting

Weighting by separation of a finger into individual elements having capacitive coupling between them. The elements may be separated from the bus bar.

2.21 Phase Weighting

Weighting by change in period of finger arrangement inside the IDT.

2.22 Aperture

Normalized beamwidth of the SAW generated at centre frequency and normalized to the corresponding wavelength.

2.3 Multistrip Coupler (MSC)

An array of additional metal strips deposited on a piezoelectric substrate in a direction transverse to the propagation direction which transfers acoustic power from one acoustic track to an adjacant track.

2.24 Reflector

A SAW reflecting component which normally makes use of the periodic discontinuity provided by a metal strip array or a grooved array.

2.25 Spurious Reflections

Unwanted signals caused by reflection of SAW or bulk waves from substrate edges or electrodes.

2.26 Triple Transit Echo (TTE)

Unwanted signals in a SAW filter which have traversed three times the propagation path between input and output IDTs, caused by reflections from output and input transducers.

2.27 Bulk Wave Signals

Unwanted signals caused by bulk wave excitation detected at the filter output.

2.28 Feed Through Signals (Signals of Electromagnetic Interference)

Unwanted signals from the input appearing at the filter output due to stray capacitances and other electromagnetic couplings.

2.29 Suppression Corrugation

Grooves in the non-active side of a substrate for suppressing bulk wave signals.

2.30 Acoustic Absorber

Material with high acoustic loss placed on any part of the substrate for acoustic absorption purposes.

2.31 Shielding Electrode

An electrode intended for the reduction of electromagnetic interference signals.

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